

Experimental Physics I

PHYS 327/328 – Spring 2024

Meeting times and instructor information:

Lectures:	MPHY 213, Mon. 1:50 – 2:40 pm
Laboratories:	MPHY 150, Mon. 3:00 – 5:50 pm (§901) MPHY 150, Wed. 3:00 – 5:50 pm (§902) MPHY 150, Fri. 3:00 – 5:50 pm (§903)
Instructor:	Dr. Dan Melconian
Contact information:	dmelconian@tamu.edu , (979)845-1411 (x260)
Office:	Cyclotron Institute, Room 331
Office hours:	By appointment
Teaching assistant:	Keith Hunter (keith.hunter@tamu.edu)
Textbook:	<i>Experiments in Modern Physics</i> , by Melissinos and Napolitano.
Laboratory Notebook:	Any lab book that is bound with numbered pages, such as <i>Computation Book</i> , Ampad #22-157.
Course webpage:	cyclotron.tamu.edu/tamutrap/phys327/

Prerequisite: PHYS 221.

Corequisite: PHYS 327 and PHYS 328 must be taken together. You may not enroll in PHYS 327 without enrolling in PHYS 328, nor vice-versa.

Course Description: Laboratory experiments in modern physics and physical optics with an introduction to current, state-of-the-art recording techniques.

Learning Outcomes: On completion of the course, students will:

1. Gain experience performing experiments that were critical to the development of modern physics.
2. Understand the theory behind these experiments and perform the relevant calculations to obtain results.
3. Calculate uncertainty in the quantities derived by their experimental data and understand the limits of experimental precision.
4. Learn how to write brief lab reports that summarize the procedures and results of experiments, as well as any conclusions derived from the work.
5. Learn to write a paper in the style of the *Physical Review*.
6. Gain experience with oral presentations such as one might give as a contributed talks at a conference.

Course Topics:

- Basic techniques in modern experimental physics;
- Uncertainty propagation and error analysis;
- Technical writing and communication.

Table 1: Tentative class schedule. “Lab 1” is the first lab you do, “Lab 2” the second, etc. Which *experiment* you do each week depends on your personal schedule. See the [course webpage](#) for details. Make sure you know which experiment you’re doing each week, and read up on it prior to attempting it!

Week	Begins	Mon		Wed		Fri
		Lecture	Lab	Lecture	Lab	Lab
1	Jan 15			Introduction	–	–
2	Jan 22	Overview of labs	–	Writing lab reports	–	–
3	Jan 29	Uncertainties	Lab 1	Least-square fitting	Lab 1	Lab 1
4	Feb 5	Giving presentations	Lab 2	Giving presentations	Lab 2	Lab 2
5	Feb 12	Comments on 1st lab reports	Lab 3	Lab topics	Lab 3	Lab 3
6	Feb 19	The term paper	Lab 4	Writing the term paper	Lab 4	Lab 4
7	Feb 26	Student presentations	Lab 5	Student presentations	Lab 5	Lab 5
8	Mar 4	Student presentations	Lab 6	Student presentations	Lab 6	Lab 6
9	Mar 11	<i>— Spring Break —</i>				
10	Mar 18	Student presentations	Lab 7	Student presentations	Lab 7	Lab 7
11	Mar 25	Student presentations	Lab 8	Student presentations	Lab 8	Lab 8
12	Apr 1	Student presentations	× [†]	Student presentations	×	×
13	Apr 8	Student presentations	Lab 9	Student presentations	Lab 9	Lab 9
14	Apr 15	Student presentations	Lab 10	Contingency; draft due	Lab 10	Lab 10
15	Apr 22	Exam review	–	Exam I	–	–
16	Apr 29	Papers due	–			

Exam 2: 3:30–5:30 May 6 (during finals)

[†]Total eclipse of the sun!

Table 2: Breakdown of grading rubric for the different course components for PHYS 327 (left), PHYS 328 (middle), and the thresholds for each letter-grade (right).

PHYS 327		PHYS 328		
Exam 2	20%	Exam 1	20%	$90\% \leq A$
Lab reports ($\times 7$)	50%	Lab reports ($\times 3$)	20%	$80\% \leq B < 90\%$
Term paper	30%	Oral presentation	60%	$70\% \leq C < 80\%$
				$60\% \leq D < 70\%$
				and $F < 60\%$

Course Evaluation and Grading Policies: Rules regarding University-excused absences are found at student-rules.tamu.edu/rule07. Only work missed with excused absences may be made up. The final grade in each of PHYS 327 and PHYS 328 will be calculated using the following rubrics listed in Table 2.

To pass the communication component, you must also pass the writing component. And vice-versa, *i.e.* you must pass each of PHYS 327 and PHYS 328 independently.

Handouts: The handouts used in this course are copyrighted. By “handouts,” I mean all materials generated for this class, which include but are not limited to syllabi, quizzes, exams, lab problems, in-class materials, review sheets, and additional problem sets. Because these materials are copyrighted, you do not have the right to copy the handouts, unless I expressly grant permission.

Attendance: Students must attend the lab in order to perform the experiments. Students must be present during their oral presentation in order to present their oral presentation. Students must attend class during other student’s presentations; students will lose 5% from their oral presentation score for any unexcused absence during other students’ oral presentation.

Late work policy: Late work is work submitted after the due date. The only late work that will be accepted is lab reports. Lab reports submitted late will lose 10% for each week or fraction thereof that they are late. No lab reports will be accepted after May 1.

Resources in communication: The University Writing Center (UWC) has trained peer consultants available to work with you on any kind of writing or speaking project, including research papers, lab reports, application essays, or creative writing, and at any stage of your process, whether you’re deciding on a topic or reviewing your final draft. You can also get help with public speaking, presentations, and group projects. We can work with you in person at our Evans or BLCC locations or via Zoom or email. To schedule an appointment or to view our handouts, videos, or interactive learning modules, visit writingcenter.tamu.edu. If you have questions, need help making an appointment, or encounter difficulty accessing our services, call 979-458-1455 or email uwc@tamu.edu.

Academic Integrity Statement: The Aggie Honour Code is “An Aggie does not lie, cheat or steal, or tolerate those who do.”

Texas A&M University students are responsible for authenticating all work submitted to an instructor. If asked, students must be able to produce proof that the item submitted is indeed the work of that student. Students must keep appropriate records at all times. The inability to authenticate one’s work,

should the instructor request it, may be sufficient grounds to initiate an academic misconduct case” ([Section 20.1.2.3, Student Rule 20](#)).

You can learn more about the Aggie Honor System Office Rules and Procedures, academic integrity, and your rights and responsibilities at aggiehonor.tamu.edu.

Americans with Disabilities Act (ADA) Policy Statement: The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact the Department of Student Life, Services for Students with Disabilities, in Room B118 of Cain Hall, or call 979-845-1637. All information and documentation concerning disability is kept confidential.

Title IX and Statement on Limits to Confidentiality Texas A&M University and the College of Science are committed to fostering a learning environment that is safe and productive for all. University policies and federal and state laws provide guidance for achieving such an environment. Although class materials are generally considered confidential pursuant to student record policies and laws, University employees – including instructors – cannot maintain confidentiality when it conflicts with their responsibility to report certain issues that jeopardize the health and safety of our community. As the instructor, we must report (per Texas A&M System Regulation 08.01.01) the following information to other University offices if you share it with us, even if you do not want the disclosed information to be shared:

- Allegations of sexual assault, sexual discrimination, or sexual harassment when they involve TAMU students, faculty, or staff, or third parties visiting campus.

These reports may trigger contact from a campus official who will want to talk with you about the incident that you have shared. In many cases, it will be your decision whether or not you wish to speak with that individual. If you would like to talk about these events in a more confidential setting, you are encouraged to make an appointment with the Student Counseling Service (scs.tamu.edu). Students and faculty can report non-emergency behavior that causes them to be concerned at (tellsomebody.tamu.edu).